## REMARKS

Applicants respectfully request favorable reconsideration of this application, as amended.

Claims 1-3, 5, 7-14, and 18-20 were rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over "Aluminum and Aluminum Alloys" pages 220, 297, 718-719, and 722. Claim 21 was rejected under 35 U.S.C. § 103(a) as being unpatentable over "Aluminum and Aluminum Alloys" pages 220, 297, 718-719, and 722.

Applicants respectfully maintain the position and arguments provided in the previous responses filed December 27, 2007 and August 28, 2008, and, additionally, offer the following amendments and remarks.

Without acceding to the outstanding rejections, independent Claims 1, 5, 20, and 21 have been amended to recite Applicants' invention with greater particularity. Specifically, amended claims 1 and 20 recite, *inter alia*, a dendrite arm spacing of between 10 and 40 micrometers (μm), and amended claims 5 and 21 recite, *inter alia*, a solidification rate that is sufficient to produce a dendrite arm spacing of between 10 and 40 μm. Amended Claim 21 further recites a step where the casting is solution heat treated for 3.9 hours to produce desired levels of transformation of $\pi$ phase to $\beta$ phase.

The above amendments more narrowly define the dendrite arm spacing for the as-cast claimed product and the corresponding solidification rate for casting the product, as well as the subsequent solution heat treating of the product. This is important because it reinforces Applicants' previous submissions that the subject invention should be regarded as a unique selection among a wide range of compositions, solidification rates, dendrite arm spacings (which are a consequence of solidification rates), and solution treatments.

An appropriate selection of alloy composition, solidification rate, and solution treatment is necessary in order to ultimately transform the π phase to the ß phase in the claimed alloy.

As discussed in the previously filed response, the common belief at the time of Applicants' invention was that low magnesium levels produce high quality castings. Applicants' invention confirms this to be the case at low solidification rates (i.e., higher Dendritic Arm Spacing or DAS), while at higher solidification rates (i.e., lower DAS), the magnesium content corresponds to improved alloy quality and therefore improved mechanical properties. See, e.g., Applicants' specification page 10, lines 5-11 and Figure 1 (a copy of Figure 1 is attached for convenience). This unexpected result demonstrates an unobvious difference between Applicants' claimed invention and the applied references.

Another unexpected result of Applicants' claimed invention is the recitation in Claim 20 that variations in Magnesium concentration within the claimed range of 0.40 to 0.45 wt% do not substantially vary the Quality Index. This means that at the peak Quality Index the claimed alloy as compared to other alloys, is less sensitive to changes in Magnesium content. Accordingly, consistency in the mechanical properties of the claimed alloy may be maximized. As can be seen from Applicants' Figure 1, the Quality Index curve peaks and flattens out in the range corresponding to a Magnesium content of 0.40 to 0.45 wt%, indicating a decreased rate of change of the Quality Index as a function of Magnesium content. See also Applicants' specification page 9, line 20.

These unobvious differences, combined with the admission that the applied reference does not disclose a Quality Index or what phases are present in the alloy, can lead only to the conclusion that it would not have been obvious to persons of ordinary

skill in the art to produce the claimed alloy, in which the sole or predominant iron-containing phase is β phase that has formed as a transformation product of the π phase. There is no evidence of record indicating that persons of ordinary skill were taking this into account. Rather, as evidenced in Applicants' specification, both the π and β phases were seen as being detrimental to mechanical properties (see page 3, lines 12-13) and, when those deleterious effects were to be reduced or eliminated, those skilled in the art took measures to eliminate the π phase — rather than transform it to β phase — by the addition of beryllium, for example.

In the rejections, the Office relies on Figure 44 on page 220 of the cited handbook as disclosing high solidification rates that produce a dendrite arm spacing of 22 μm with an A356.0 alloy. See the paragraph bridging pages 2 and 3 of the Office Action. The Office notes in an earlier section of the Office Action that the composition of an A356.0 alloy overlaps the range of the composition of Applicants' claimed invention. The Office will note, however, that Figure 44 discloses a wide range of dendrite arm spacings, i.e., from 22-114 μm and this range covers high through low solidification rates. Accordingly, there is no basis in the applied reference to select a solidification rate that produces a dendrite arm spacing of 22 μm any more than there is a basis to select a dendrite arm spacing of 100 μm, which is outside Applicants' claimed invention. Moreover, there is no teaching or suggestion in Figure 44 and the disclosure that relates to Figure 44 that the solution treatment of the cast alloy would transform π phase to ß phase as in Applicant's claimed invention. The Office recognizes this point and, consequently, after mentioning the 22 μm dendrite arm spacing, the Office then states that the "alloy" is typically solution treated, quenched in hot water, and aged, as disclosed in Table 36 on page 722 of the handbook reference, using substantially the same process steps as

Applicants' claimed invention. The Office will note, however, that the Figure 44 alloy was obtained from plates that were cast in plaster molds and thereafter heat treated in a T62 treatment, while the data in Table 36 was obtained from test bars that were cast in sand and permanent molds and then heat treated and aged in different heat treatments. Hence, the data in Figure 44 and Table 36 are not directly comparable. Consequently, one of ordinary skill in the art would not have had reason to look to combine the data in Table 36 with that of Figure 44, in an attempt to produce Applicants' claimed invention.

Accordingly, Applicants' claimed invention distinguishes patentably over the applied reference. The rejections under 35 U.S.C. §§ 102(b) and 103(a) should be withdrawn.

Dependent Claims 22 and 23 have been added to provide more comprehensive protection for Applicants' invention and are also believed to distinguish patentably over the applied reference. Note, for example, that the recited dendrite arm spacing in the matrix of between 10 and 20 μm is neither taught nor suggested by the applied reference.

In view of the foregoing amendments and remarks, Applicants believe that the currently pending claims are allowable and respectfully request that the Examiner issue a Notice of Allowance.

Should the Examiner believe that any further action is necessary to better place this application in form for allowance, the Examiner is invited to contact Applicants' representative at the telephone number listed below.

The Commissioner is hereby authorized to charge to Deposit Account No. 50-1165 (T2211-906224) any fees under 37 C.F.R. §§ 1.16 and 1.17 that may be required by this paper and to credit any overpayment to that Account. If any extension of time is

required in connection with the filing of this paper and has not been separately requested, such extension is hereby requested.

Respectfully submitted,

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